dissertation was written, he began to work on the voluminous materials and collections accumulated by previous Russian explorers of Mongolia and China. How big the task was, might be judged by the fact that Komarov's monograph on Chinese *Caragana* contains 22 new species. Although the "Flora of China and Mongolia" was never completed, Komarov did finish several monographs intended for it. When in 1922 the Botanical Institute of the Academy undertook the publishing of the "Flora of USSR," Komarov became its editor-in-chief. In addition to occupying this supervisory position, he also contributed to the "Flora" as a rank-and-file botanist. Komarov's other botanical contributions are too numerous to mention. More than one hundred titles deal with the vegetation of the Russian Far East, and many papers are devoted to the flora of central Asia and Siberia.

As a student in Komarov's classes from 1914 through 1916 I remember him as being very quick in all that he did, and his lectures were sometimes quite witty and sarcastic. Then and throughout his life, his mind was occupied by the problem of what constitutes a species. In the introduction to the "Flora of Manchuria," as well as in his later works, he devoted a great deal of space to this problem.—N. T. Mirov, California Forest and Range Experiment Station, Berkeley.

THE PRESENT STATUS OF THE GENUS POLEMONIELLA HELLER

John F. Davidson

The status of the genus *Polemoniella,* in which has been included *P. micrantha* (Benth.) Heller, *P. antarcticum* (Griseb.) Nelson & Macbride, and *P. Gayanum* (Wedd.) Nelson & Macbride, has been doubtful ever since Heller (1904, p. 57) segregated it from *Polemonium.* Brand (1907) reduced it to a synonym of *Polemonium,* whereas Nelson and Macbride (1916, p. 35) and Wherry (1941) accepted Heller's genus.

Heller differentiated between *Polemonium* and *Polemoniella* as follows:

Character	*Polemoniella*	*Polemonium*
Inflorescence	scattered, solitary	cymose panicles or racemes
Flower shape	nearly rotate	mostly funnelform
Filament base	nearly naked	dilated pilose appendaged
Corolla length	less than calyx	several times calyx
Flower size	small, inconspicuous	showy
Habit	annual	perennial

Close examination of the inflorescence of *Polemoniella micrantha* (Benth.) Heller shows that the inflorescence is sympodial. In this type of inflorescence, a flower is borne terminally, and from the axil of the uppermost leaf a bud develops into an elongated branch bearing a terminal flower and a subterminal leaf. From the axil of the latter leaf another branch develops in a like manner, so that under favorable conditions in this species five or more flowers may be produced, apparently on a central axis, but with the leaf opposite the pedicel, not as a subtending bract. Under unfavorable conditions, of course, the plant may produce only a single flower, as may occur in similar circumstances in many polemoniums.

In *Polemonium pulcherrimum* Hook. there are many individuals in which the excessive elongation of the lateral branches of the inflorescence suggests this sympodial condition. At the northern limit of distribution some of the plants also exhibit greatly reduced inflorescences, so that in Alaska and the Aleutian Islands it is not uncommon to see only a single flower on the lateral branches. In this condition, the inflorescence is identical with that of *Polemoniella micrantha,* and is the only known occurrence of the sympodial inflorescence in the perennial polemoniums. The unusual appearance of these northern specimens at first suggested a specific or subspecific separation from *Polemonium pulcherrimum,* but analysis of the specimens throughout the range of that species shows the tendency for the elongation of the lateral branches to be widespread throughout the population, and the reduction of flowers is gradual as the northern limit is approached. Thus the material examined is regarded as at most an ecotype of *P. pulcherrimum.*

Regarding Heller's conception of flower shape, it is difficult to visualize a rotate or nearly rotate corolla included within a campanulate calyx. The corolla of *Polemoniella micrantha* is more aptly described as "short-campanulate." While the corollas of such polemoniums as *Polemonium pauciflorum* Wats. and *P. confertum* A. Gray are certainly funnelform, those of *P. occidentale* Greene, *P. pulcherrimum* Hook., and *P. carneum* A. Gray are at least as nearly rotate as those of *Polemoniella.*

Many polemoniums have undilated filaments, similar to those of *Polemoniella micrantha,* while other species of *Polemonium* have dilated filaments like those of *Polemoniella antarctica* (Griseb.) Nelson & Macbride. While the filaments of *Polemoniella* are nearly naked at the bases, those of *Polemonium Lemmoni* Brand are completely so. The filaments of the perennial species of *Polemonium* vary from glabrous to densely woolly.

In the Polemoniaceae both the annual and perennial habits are common. In the primarily perennial genus *Phlox,* for example, *P. Drummondii* Hook. is undoubtedly a *Phlox,* despite its annual habit. Similarly in *Collomia,* the annuals, *C. linearis* Nutt. and *C. grandiflora* Dougl. occur in a genus in which perennials are

common. The writer has at present several species of *Polemonium* growing in experimental plots at Berkeley, California, and Vancouver, British Columbia. Of these plants, some perennial species (*P. caeruleum* L., *P. foliosissimum* A. Gray, *P. pauciflorum* Wats., and *P. pulcherrimum* Hook.) have produced viable seeds within six months of germination. In Berkeley, some individuals of *P. pauciflorum* and *P. foliosissimum* have died following seed production, although they received the same care as the persistent individuals of the species. While the latter were behaving as normal perennial plants, the former, since the seeds produced were viable, obviously were behaving as annuals. The possibility of such a reaction occurring also in nature cannot be overlooked.

In other genera of the family the annual or perennial habit apparently is not considered of generic significance, nor does the writer so consider it here. The only remaining point separating *Polemoniella* and *Polemonium* is the fact that the corolla is shorter than the calyx, the flower being therefore inconspicuous. This distinction appears to have been broken down, also. Ostenfeld (1923), in discussing genetic experiments with *Polemonium caeruleum,* mentions the occurrence of natural populations of this species in which micropetalous flowers were common, including some in which the corollas were shorter than the calyces.

In sharp contrast to the supposed differences between these two groups discussed above are the following features which *Polemonium* and *Polemoniella* have in common:

Leaves pinnately divided.
Leaflets predominantly ovate to elliptical.
Calyx herbaceous throughout, campanulate, accrescent.
Corolla from rotate-campanulate to narrowly funnelform, with no sharp distinction between tube and throat.
Stamens of equal length, inserted equally on the tube.

It would appear from the above evidence that Brand's (1907) treatment of *Polemoniella* as a synonym of *Polemonium* is correct.

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